Toward the Establishment of a Regional Society that is Safe and Secure from Disasters

by

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ABSTRACT

Disaster protection measures that have been taken in Japan have primarily been individual measures such as construction of structures designed hypothesizing the external forces of each disaster and providing information during disasters etc. In recent years, the forms of natural disasters and the natural and social environments in which they occur have been transformed. This report presents policies guiding initiatives that should be taken in Japan based on our awareness that we must take comprehensive measures hypothesizing overall society and implement a PDCA based management cycle constantly focused on actual conditions in order to build a society that is safe and secure from natural disasters.

KEYWORDS: Evaluation Indices, Natural Disaster, PDCA Cycle, Safe and Secure Societies, Social Capital

1. INTRODUCTION

As a nation that has often suffered and recovered from natural disasters of many kinds, Japan has striven continuously to ensure its safety in numerous areas and bodies, contributing greatly to the safety of Japanese society.

But nearly every year, Japan continues to experience disasters that extract a heavy toll in human suffering and destruction of property, as it faces new phenomena impeding and restricting our efforts to ensure a safe and secure society.

Enhancing Japan’s capacity to withstand dangerous phenomena and creating ways to construct a safe and secure society whose people can enjoy rich and high standard lives is our generation’s mission, and we must deemphasize the pursuit of economic efficiency to begin working to create a safe and secure society as its top priority.

The Science Council of Japan established the “Committee to Construct the Foundations of a Society that is Safe and Secure From Global Scale Natural Disasters” in February 2006, and this committee is undertaking a study in response to an inquiry entitled “Effective Ways to Reduce Damage Caused by Changing Global Scale Natural Disasters (June 2006)” from the Ministry of Land, Infrastructure and Transport and plans to issue a report and response in May 2007.

Aware that, under these circumstances, instead of individual measures such as constructing facilities designed to deal with the external force of individual disasters and providing information in the event of a disaster as has been done until now, we must now undertake comprehensive initiatives guided by an overall vision of human society that permits the establishment of a society safe and secure from natural disasters including self-help and mutual support and that

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we must take measures premised on smooth restoration after a disaster has occurred, we have prepared a tentative plan that presents ways to achieve these goals in Japan.

2. PRESENT STATUS RELATED TO NATURAL DISASTERS

We must be fully aware of present problems that have appeared as a consequence of the great changes to the environment that are now occurring on a global scale so we can consider how to ensure a safe and secure society, and we must find ways to appropriately diagnose and prescribe curative measures for such scenarios to prevent people from needlessly feeling fear and anxiety about a variety of scenarios whose likelihood of occurring have not been clarified.
The following are noteworthy recent changes in the natural and social environments in Japan that we must consider.

(1) Growing power of dangerous phenomena

Frequent large-scale disasters occurring around the world are continuously presenting us with new forms of disasters that we must prepare for. In Japan we fear increasingly severe local meteorological events linked to global warming such as rising tides or more frequent and more severe torrential rainfall. We are also fearful that an intraplate earthquake directly under Tokyo or the Tokai, Tonankai, Nankai, or other devastating undersea earthquakes and the tsunami they would trigger will strike Japan in the near future.

(2) Decline of regional capacity to fight disasters

The aging, depopulation, and transformation of regional communities, the deterioration of their flood fighting squads and other social systems, the disappearance of empirical knowledge formerly handed down within the regions, the establishment of an urban residential consciousness isolated from nature, and other factors, have all contributed to the appearance of a deterioration of the disaster fighting capacity and the social capital that have been maintained by each region.

(3) The weakness inherent in the expansion, increasing sophistication, and rising complexity of urban systems

As urban systems expand, are concentrated, and become increasingly sophisticated and complex, these linked trends may contribute to an underlying weakening of a society’s ability to withstand dangerous phenomena. This weakness might be revealed in the unstable behavior and collapse of individual systems under particularly unpredictable external forces, and in the chain reaction and radiating expansion of damage caused by the simultaneous collapse of such individual systems.

(4) Expanding weakness of infrastructure facilities and organizations etc.

We must strive to take measures, obtain resources, and train personnel needed to prevent the deterioration of the functions of disaster protection systems and disaster protection facilities from reducing safety, even from changing external conditions described above. We also face the challenge of training experts in disaster prevention and social infrastructure and of fighting the decline of regional industries that support their recovery from disasters.

3. BASIC CONDITIONS FOR REGIONAL SOCIETIES THAT ARE SAFE AND SECURE FROM DISASTERS

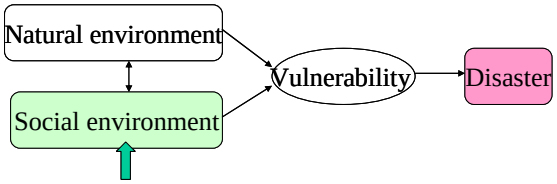

Image of a (region) society safe and secure from natural disasters

Figure 1. Vulnerability of the Environment and Natural Disasters

Natural disasters are related to vulnerability created by the interrelationship of the natural environment and the social environment (Fig. 1), although, as stated above, both have been undergoing major transformations in recent years.

The Intergovernmental Panel on Climate Change (IPCC) announced the fourth report of its First Working Group on February 2007. This report stated that the future rise of the sea level will be seriously impacted by changes in the ice-covered regions such as Greenland and Antarctica. The second Working Group report announced in April states that it is important to not only construct protection structures; but to also introduce wide area adaptations extending into the social and economic spheres.

Therefore, assuming that it is important to clarify the entire social environment that can be artificially controlled as an “image of regional societies safe and secure from natural disasters”, with reference to the initiatives taken under the “Grand Challenges for Disaster Reduction” in the U.S., we have considered the directions of initiatives to be taken in Japan based on our fundamental awareness of the following issues.

 Comprehensively establishing the essential conditions for a safe and secure society as those which, including public demands for their achievement, must be achieved by adopting a posture of exhaustively observing overall regional societies.

 While creating a common awareness shared by related organizations of all kinds, establishing a process of constantly evolving and deepening bonds in response to actual conditions.

The first step is to list conditions that should be achieved, maintained, and encouraged as basic essential conditions to answer the question, “What is a society safe and secure from disasters?” As a result we have organized the four fields shown in Figure 2 (knowledge, social capital, information systems, and resistance to and ability to recover from disasters). Then, the specific contents of the fundamental essential conditions that have been categorized and organized in this way are explained, aware of each participant: individuals, companies, infrastructure related companies, disaster protection organizations. The details are presented in Reference 1.

Table 2 shows the results of abstracting and listing the activities that disaster protection organizations should undertake to achieve these essential conditions, and similarly categorizing and organizing them under four categories. Disaster protection organizations are not only municipalities and other organizations that bear direct responsibility for disaster protection, but research organizations who support these activities and other public bodies that manage and maintain infrastructure. Table 1 and Table 2 present the relationships between all items with codes. (For example, it is necessary for disaster protection organizations to continue to take activities a-1, a-2, and a-3 in order to achieve A-1.)

(1) Knowledge ---- Advance understanding

Figure 2. Image of a (Region) Society Safe and Secure from Natural Disasters

of natural disasters.

We assume that each body and organization has fundamental knowledge of natural disasters including the action that it should take in an emergency according to its own roles and responsibilities, and that it reflects this knowledge in its actions as a premise for the existence of a safe and secure society. Therefore, disaster protection organizations must continuously collect and analyze data concerning dangerous phenomena, the capacity of disaster protection facilities to withstand disasters, the mechanisms of the occurrence of dangerous phenomena, the impact of disasters on society and the economy, and crisis management and cost of damage.

(2) Social capital --- Possibility of mutual trust, cooperation and mutual assistance.

Social Capital is defined as, for example, "Characteristics of social organization featuring trust, norms, and networks that can increase the efficiency of a society by enlivening cooperative human activities" (Putnam, Quality of Life Policy Bureau, Prime Minister's Office), and we assume that it plays a particularly important role in increasing a region's disaster protection capacity.

It is necessary that in addition to residents of a region trusting and supporting each other, disaster protection organizations also earn the trust of residents by communicating with them and by providing them with easily understood information at all times, and that concerned organizations build trusting relationships.

(3) Information systems --- Availability of needed information when it is required.

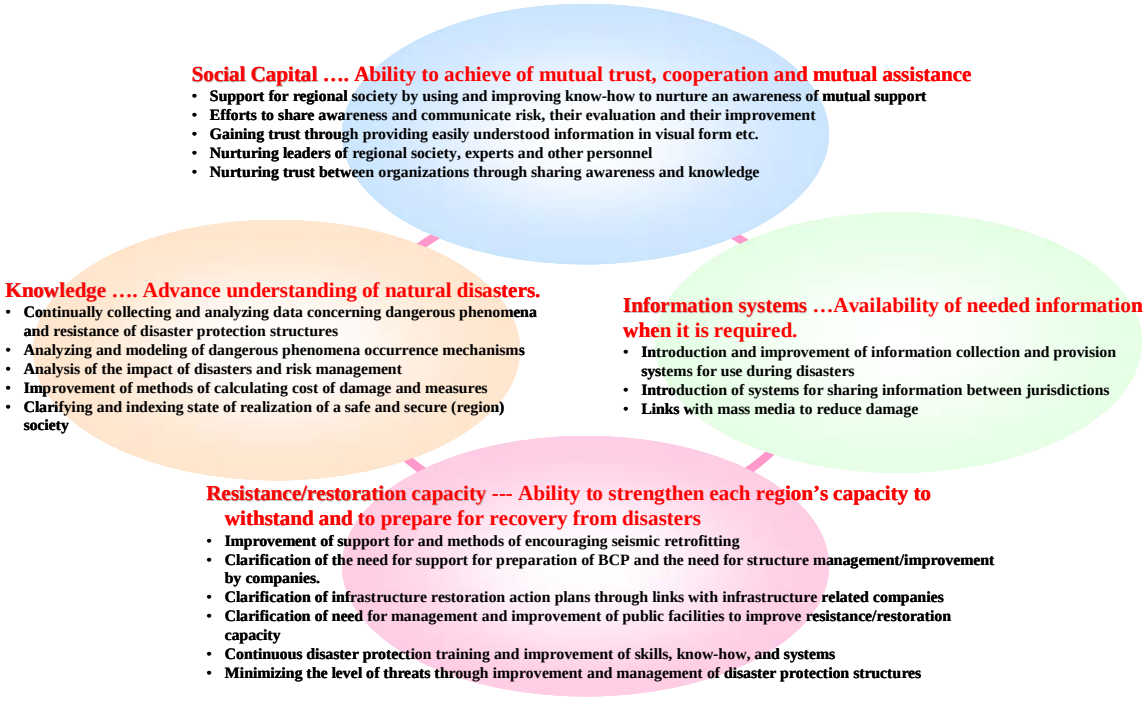

Figure 3. Actions that Disaster Protection Organizations Should Take toward Realization

When necessary, for example, a disaster has occurred, each body and organization must continually clarify constantly changing circumstances, understand the nature of its threat and take prompt and appropriate action in response. This means that disaster protection organizations must establish systems that, in addition to collecting and providing information, share information with other jurisdictions. It is also essential to build systems that enable members of the local media to fill their roles properly.

(4) Resistance to and ability to recover from disasters --- Ability to strengthen each region's capacity to withstand and to prepare for recovery from disasters

Organizations must constantly provide both non-physical and physical infrastructures that increase a region's capacity to withstand and to recover from disaster damage in order to lay the foundations for a regional society that is safe and secure from disasters. The provision and maintenance of disaster protection facilities and advance measures taken by both individuals and by companies that have been carried out in the past have been categorized as part of this category.

Concerning particularly large scale disasters, disaster protection organizations must recognize the importance of partially preventing the impact of such disasters and simplifying recovery, and continue to index and clarify the status of elements that should be considered in order to be able to take appropriate measures that combine physical and non-physical means to minimize the level of the threat to a level acceptable to society.

4. Action that disaster protection organizations should take and verification of each dangerous phenomenon

It is necessary for disaster protection organizations to take continuous initiatives to

achieve regional societies that are safe and secure from natural disasters. Figure 3 selects and lists actions that should be specifically taken and similarly categorizes these into four groups, and details are shown in Reference 2. Disaster protection organizations include, not only cities, towns, and villages and other organizations that are directly responsible for disaster protection but also research organizations that support their activities and public bodies that manage and construct infrastructures.

Actions that disaster protection organizations should take including research activities of the NILIM, are broken down for each dangerous phenomena regarding items in Reference 2, because the specific action that should be taken in response to each dangerous phenomenon such as flood, sediment-related disaster, or earthquake varies. This has been prepared by repeated brain storming by concerned members and by meetings to air and compare views with concerned research departments as a "Grand Framework" of research activities concerning disaster protection at the NILIM. In the future, we wish to conduct specific research activities in line with this framework and at the same time, to broaden the objects of dangerous phenomena and further evolve specific actions through the PDCA management cycle that is described below.

5. ESTABLISHMENT OF A MANAGEMENT CYCLE TO REALIZE SAFE AND SECURE REGIONAL SOCIETIES

The states that should be realized, maintained, and strengthened as the essential conditions for regional society safe and secure from natural disasters (Fig. 2), must be constantly clarified in each field and by each body, and their improvement must be undertaken by disaster protection organizations. This can be realized as a management cycle based on PDCA. (Fig. 4)
Table 1 shows the major contents of essential conditions for a regional society shown in Figure 2, by body. In this process, important roles of disaster protection organizations that they must fill are to constantly clarify conditions in four areas—knowledge, social capital, information systems, and resistance/restoration capacity —at each acting body. Reference 1 shows an example of evaluation indices to achieve this, but important future challenges are research and development of methods and evaluation indices to be applied to evaluate levels of knowledge, social capital, etc. that have a big impact on, for

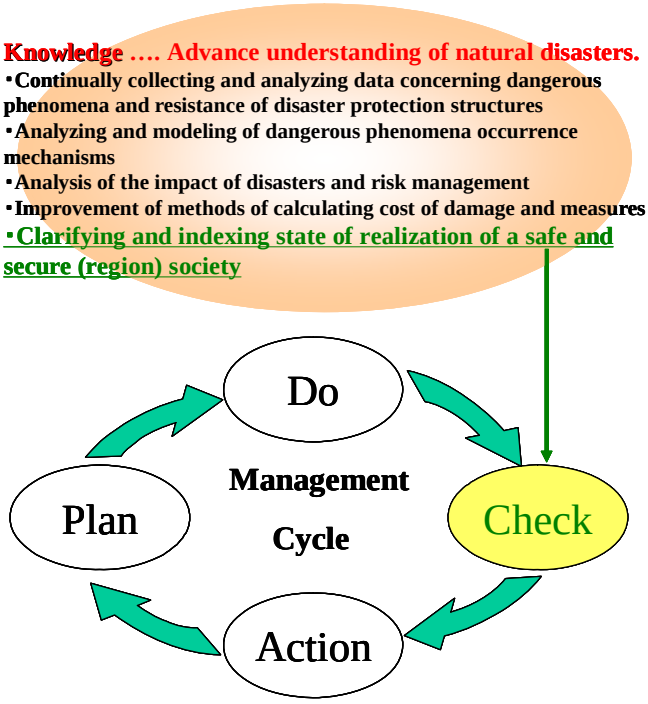

Figure 4. Management Cycle in Activities of Disaster Protection Organizations

example, people's evacuation action in the face of dangerous phenomena.

6. FUTURE INITIATIVES

These initiatives will, as their fundamental understanding, be implemented with constant reference to a process of continual evolution and deepening of relationships in response to actual situations through nurturing of a common awareness between concerned organizations of all kinds (Management cycle based on PDCA). So guided by an awareness that it is necessary to form links with concerned organizations centered on the Ministry of Land, Infrastructure and Transport, it includes policies concerning actions and initiatives that regional development bureaus take to approach other concerned organizations.

In the future, we will deepen and organize our discussions on the directions of initiatives taken to deal with each dangerous phenomenon discussed above and to promote projects in cooperation with other disaster protection related organizations, regional development bureaus and other concerned organizations in the field.

And we wish to advance this proposal based on actual conditions while repeating the PDCA cycle by selecting issues that are worth researching but have not been yet been studied at the NILIM, setting priorities, circulating technologies including those at regional development bureaus and other organizations in the field, training experts, and deepening links with concerned organizations.

7. REFERENCES

1. Grand Challenges for Disaster Reduction , Committee on Environment and Natural

Table 1. "Image of a Regional Society Safe and Secure from Natural Disasters" Categorized by Concerned Actor

	Advance understanding of natural disasters **A** [Knowledge]	**Ability to achieve mutual trust, cooperation and mutual assistance** **B** [Social capital]	**Availability of needed information when it is required** **C** [Information systems]	**Ability to strengthen each region's capacity to withstand and to prepare for recovery from disasters** **D** [Resistance/restoration capacity]
Individual/region	●Have basic knowledge of natural disasters and know what action to take when a disaster occurs	●Can trust and mutually assist other members of regional society ●Disaster protection leaders, experts etc. are constantly active ● Already trusts disaster protection organizations	● Can clarify state necessary for evacuation action and gain understanding when a disaster occurs.	● Seismically retrofit homes and purchase disaster insurance
Companies	●Have basic knowledge of natural disasters and know the social mission and roles of companies and industries when a disaster occurs	●Can take part in volunteer activities and provide assets, products etc. in its possession when a disaster occurs ● Already trusts disaster protection organizations	● Can clarify state necessary for implementation of BCP and gain understanding when a disaster occurs.	●Have and regularly revise BCP
Infrastructure related companies	●Have basic knowledge of natural disasters and know the process of interaction of damage to infrastructures	● Already shares knowledge and awareness with infrastructure related companies and can take coordinated action when a disaster occurs.	● Can clarify the situation from moment to moment and provide information using intuitive easily understood methods when a disaster occurs.	●Have and regularly revise BCP to restore infrastructure ●Can manage and improve structures to ease restoration and to minimize damage by disasters
Disaster protection organizations	●Have basic knowledge of natural disasters and know the process of interaction of damage to infrastructures ●Have knowledge of the (region) society and can clarify its social capital, information and resistance/restoration capacity.	● Already shares knowledge and awareness with infrastructure related companies and disaster protection organizations, and can take coordinated action when a disaster occurs.	● Can clarify the situation from moment to moment and provide information and order evacuations using intuitive easily understood methods when a disaster occurs. ● Can share information that constantly changes with disaster protection organizations and take coordinated action when a disaster occurs.	●Have and regularly revise COOP to restore infrastructure ● Have established a system permitting appropriate life saving and flood fighting activities when a disaster has occurred ●Can manage and improve disaster protection structures etc. to minimize the level of threat of flooding and can maintain the level of threat.

Checked by disaster protection organizations based on appropriate evaluation indices……PDCA cycle to achieve safe and secure region (society)

Resources , National Science and Technology Council , June 2005
2. Report by the Committee on Science and Technology Policies to Contribute to the Building of a Safe and secure Society , Ministry of Education, Culture, Sports, Science and Technology , April 2004
3. Junko Mimaki, Ryou Fujikura , Research on Improvement of Disaster Protection Projects in International Aid,,, Based on Cases Concerning Factors Improving Regional Disaster Protection Capabilities , International Development Research , June 2006

Reference-1

Image of a (Region) Society Safe And Secure From Disasters (Proposed)

Individuals

	Advance understanding of natural disasters **A** [Knowledge]	**Possibility of mutual trust, cooperation and mutual assistance** **B** [Social capital]	**Availability of needed information when it is required** **C** [Information systems]	**Ability to strengthen each region's capacity to withstand and to prepare for recovery from disasters** **D** [Resistance/restoration capacity]
State that should be achieved, maintained, and advanced	● **[A-1 Basic knowledge of natural disasters]** Individuals already possess the following as basic knowledge about natural disasters. ・True state of threats and nearby dangerous locations ・Mechanisms and precursor phenomena ・Present state of and future prospects for disaster facilities and disaster protection organizations ・Present state and future prospects of threats ・Advance measures ・Contents of (initial period) activities (including cooperation and mutual aid) ・Post disaster measures etc.	● **[B-1 Trust and mutual support]** Individuals can trust and mutually support others in the regional society regarding the following matters. ・Giving and receiving knowledge of natural disasters ・Taking advance measures ・Giving and receiving information during a disaster ・Acting during a disaster ・Supporting people who require assistance ・Taking post-disaster measures etc. ● **[B-2 Daily activities and existence of leaders]** Municipal government and voluntary disaster protection organizations that have been formed by individuals are normally highly active and their members include leaders and experts. ● **[B-3 Contributing to society]** Individuals and companies can volunteer energetically, or can voluntarily and smoothly supply resources or products they possess when a disaster occurs. ● **[B-4 Disaster protection organizations earning people's trust]** Individuals and companies trust disaster protection organizations regarding the following matters. ・Contents of knowledge concerning natural disasters that has been provided ・Provision of information contributing to action when a disaster occurs and contents of this information ・Maintaining and improving capacity to withstand and to recover from disasters by appropriately managing and improving disaster protection facilities.	● **[C-1 Clarifying present state of threats]** Individuals can clarify constantly changing conditions and understand the threat related to the following actions without being confused by rumors when a disaster has occurred. ・Measures immediately before a disaster ・Evacuation ・Deployment and returning home ・Support activities (volunteers) etc.	● **[D-1 Advance measures by individuals]** Individuals take the following actions as advance measures ・Seismic diagnosis and seismic retrofitting of homes ・Preparing goods necessary during disasters ・Planning the details of actions during disasters ・Purchasing disaster insurance, etc.
Evaluation indices (proposed)	●Participation rate in disaster protection WS etc. ●Participation rate in regional disaster protection training etc. ●Awareness of hazard maps ●State of evacuation in response to dangerous phenomena	●Percentage of people requiring care covered by a support system based on mutual assistance ●Percentage of existence of disaster protection leaders in local administrations ●Percentage of members participating in volunteer activities in local administration etc. ●Degree of trust in disaster protection organizations (questionnaire surveys etc.)	● State of acquisition of information when a disaster occurs	● Percentage of homes receiving seismic diagnosis and seismic retrofitting ● Disaster insurance purchase rate

Companies

	Advance understanding of natural disasters **A** [Knowledge]	**Possibility of mutual trust, cooperation and mutual assistance** **B** [Social capital]	**Availability of needed information when it is required** **C** [Information systems]	**Ability to strengthen each region's capacity to withstand and to prepare for recovery from disasters** **D** [Resistance/restoration capacity]
State that should be achieved, maintained, and advanced	● **[A-2 Basic knowledge of natural disasters]** In addition to the above items concerning all kinds of natural disasters, companies know the following from the perspective of companies and industries. ・True state of threats and nearby dangerous locations ・Mechanisms and precursor phenomena ・Present state of and future prospects for disaster facilities and disaster protection organizations ・Present state and future prospects of threats ・Advance measures ・Contents of (initial period) activities (including cooperation and mutual aid) ・Post disaster measures etc. ・Social mission and roles of companies and industries when disasters occur ・Danger with potential impact on society (storage of hazardous materials etc.)	● **[B-3 Contributing to society]** Individuals and companies can volunteer energetically, or can voluntarily and smoothly supply resources or products they possess when a disaster occurs. ● **[B-4 Disaster protection organizations earning people's trust]** Individuals and companies trust disaster protection organizations regarding the following matters. ・Contents of knowledge concerning natural disasters that has been provided ・Provision of information contributing to action when a disaster occurs and contents of this information Maintaining and improving capacity to withstand and to recover from disasters by appropriately managing and improving disaster protection facilities.	● **[C-2 Clarifying present state of threats]** Corporations can understand and clarify the present situation and threats as necessary to take action based on BCP during a disaster.	● **[D-2 Advance measures by corporations and industry related organizations]** Companies have BCP and carry out successive reforms and work regularly to move or concentrate facilities that are in danger or to improve their disaster protection functions.
Evaluation indices (proposed)	●Participation rate in regional disaster protection training etc. ●State of recording in BCP of details of support for regions when a disaster occurs	● State of support for regions when a disaster occurs (percentage of supporting companies) ● State of holding consultative meetings including disaster protection organizations	● Obtaining needed information when a disaster occurs	● State of enactment of BCP

Infrastructure related companies

	Advance understanding of natural disasters **A** [Knowledge]	**Possibility of mutual trust, cooperation and mutual assistance** **B** [Social capital]	**Availability of needed information when it is required** **C** [Information systems]	**Ability to strengthen each region's capacity to withstand and to prepare for recovery from disasters** **D** [Resistance/restoration capacity]
State that should be achieved, maintained, and advanced	● **[A-3. Basic knowledge of natural disasters]** Infrastructure related companies and disaster protection organizations are already aware of the above items related to natural disasters from various perspectives, and also know about the following from various perspectives ・ True state of threats and nearby dangerous locations ・ Mechanisms and precursor phenomena ・ Present state of and future prospects for disaster facilities and disaster protection organizations ・ Present state and future prospects of threats ・ Advance measures ・ Contents of (initial period) activities (including cooperation and mutual aid) ・ Post disaster measures etc. ・ Social mission and roles of companies and industries when disasters occur ・ Danger with potential impact on society (storage of hazardous materials etc.) ・ Process of mutual impact between damage to various infrastructure elements	● **[B-5 Sharing information and cooperative action]** Infrastructure companies and disaster protection organizations already share knowledge, information and experiences, and maintain links enabling them to mutually supplement each other's efforts when a disaster occurs.	● **[C-3 Providing information to take appropriate action]** Concerning actions of individuals, companies, and industry related organizations during a disaster, infrastructure related companies and disaster prevention organizations can clarify constantly changing conditions and can reliably and promptly provide information that can be applied to appropriate action using methods that make it easily understood visually and through other senses.	●**[D-3 Improving capacity to reduce or restore damage]** Infrastructure related companies and disaster prevention organizations make the following preparations (improving damage reduction capacity) concerning restoration or reconstruction. ・ Setting infrastructure restoration priority ・ Ensuring human resources, materials and equipment necessary for restoration ・ Managing and improving facilities etc. in order to simplify restoration and restrict the impact of disasters. etc.
Evaluation indices (proposed)	●State of hypothesis of the process of mutual impact in BCP	●State of signing agreements between infrastructure related companies ●State of holding consultative meetings including disaster protection organizations	●Rate of provision of systems to provide information to individuals and companies ●Comprehensibility, through visual methods etc., of information provided	●State of enactment of BCP ●State of response to items recorded above in BCP

Disaster protection organizations

	Advance understanding of natural disasters **A** [Knowledge]	**Possibility of mutual trust, cooperation and mutual assistance** **B** [Social capital]	**Availability of needed information when it is required** **C** [Information systems]	**Ability to strengthen each region's capacity to withstand and to prepare for recovery from disasters** **D** [Resistance/restoration capacity]
State that should be achieved, maintained, and advanced	●**[A-3. Basic knowledge of natural disasters]** Infrastructure related companies and disaster protection organizations are already aware of the above items related to natural disasters from various perspectives, and also know about the following from various perspectives ・ True state of threats and nearby dangerous locations ・ Mechanisms and precursor phenomena ・ Present state of and future prospects for disaster facilities and disaster protection organizations ・ Present state and future prospects of threats ・ Advance measures ・ Contents of (initial period) activities (including cooperation and mutual aid) ・ Post disaster measures etc. ・ Social mission and roles of companies and industries when disasters occur ・ Danger with potential impact on society (storage of hazardous materials etc.) ・ Process of mutual impact between damage to various infrastructure elements ●**[A-4 State of (region) society and impact of damage]** Disaster protection organizations already know about the following. ・ Individuals, companies, infrastructure related companies and disaster protection organizations respectively, already known present status of Knowledge, Social capital, Information systems, Resistance to and ability to recover from damage. Type and degree of impact of disasters on human lives, society, and the economy in various regions etc.	●**[B-5 Sharing information and cooperative action]** Infrastructure companies and disaster protection organizations already share knowledge, information and experiences, and maintain links enabling them to mutually supplement each other's efforts when a disaster occurs.	● **[C-3 Providing information to take appropriate action]** Concerning actions of individuals, companies, and industry related organizations during a disaster, infrastructure related companies and disaster prevention organizations can clarify constantly changing conditions and can reliably and promptly provide information that can be applied to appropriate action using methods that make it easily understood visually and through other senses. ● **[C-4 Transmitting evacuation orders and instructions and confirmations]** Disaster protection organizations can reliably and promptly transmit, in addition to the above items, evacuation orders to protect human lives, instructions and confirmations etc. based on disaster protection agreements to individuals, companies, and industry related organizations during a disaster. ● **[C-5 Sharing information between disaster protection organizations]** Disaster protection organizations can share knowledge and information to take unified action during a disaster.	●**[D-3 Improving capacity to reduce or restore damage]** Infrastructure related companies and disaster prevention organizations make the following preparations (improving damage reduction capacity) concerning restoration or reconstruction. ・ Setting infrastructure restoration priority ・ Ensuring human resources, materials and equipment necessary for restoration ・ Managing and improving facilities etc. in order to simplify restoration and restrict the impact of disasters. etc. ●**[D-4 Improving emergency aid and support capacities]** Disaster prevention organizations can appropriately take actions such as the following to reduce damage during a disaster. ・ Flood fighting ・ Live saving ・ Helping victims ・ Supporting restoration ●**[D-5 Managing and improving disaster protection facilities etc.]** Disaster protection organizations can minimize the level of threats to a level acceptable to a (region) society and maintain this state by preventive preliminary conservation measures such as management and improvement of disaster prevention facilities.
Evaluation indices (proposed)	● Coverage rate and contents of hazard maps ● Clarification rate of state of disaster protection structures and percentage added to date base ● State of knowledge, social capital, information systems, resistance/restoration capacity	●State of holding consultative meetings between companies and disaster protection organizations	●Rate of provision of systems to provide information and evacuation orders to individuals and companies ●Rate of provision of systems for sharing of information among disaster protection organizations	● State of enactment of COOP ● Performance of countermeasure headquarters and fire fighting activities etc. to deal with dangerous phenomena ● Rate of achievement of management and improvement levels of disaster protection structures

Reference-2

State of Action by Disaster Protection Organizations to Achieve Goals (Draft)

	Advance understanding of natural disasters **A** [Knowledge]	**Possibility of mutual trust, cooperation and mutual assistance** **B** [Social capital]	**Availability of needed information when it is required** **C** [Information systems]	**Ability to strengthen each region's capacity to withstand and to prepare for recovery from disasters** **D** [Resistance/restoration capacity]
State that should be achieved, maintained, and advanced	● **[a-1 Dangerous phenomena and capacity of disaster protection facilities to withstand them]** Data concerning dangerous phenomena and capacity of disaster protection facilities to withstand dangerous phenomena (including degree of deterioration) are obtained by an appropriate monitoring system, and these data are saved and analyzed so that necessary data can be extracted when it is needed. ● **[a-2 Dangerous phenomena occurrence mechanisms]** Dangerous phenomena occurrence mechanisms are analyzed and appropriately modeled to improve the precision of predictions. ● **[a-3 Impact of disasters and crisis management]** Standard analysis methods are available to deal with the impacts of disasters and to perform crisis management when a disaster occurs and used to continuously accumulate experiences such as the following. ・ Process of the mutual impact of damage to infrastructure elements. ・ Process that impacts human lives, society, and the economy ・ Expertise in individual advance measures, details of actions during disasters and post disaster measures ・ Details of actions by companies during disasters and their roles in restoration. ・ Expertise and effective systems for performing crisis management by disaster protection organizations	● **[b-1 Cultivating awareness of mutual aid]** Expertise and tools (hazard maps etc.) that nurture mutual aid awareness and are applied to practice mutual aid during disasters are available, evaluated, their effectiveness is continuously improved and they are used to support the (region) society. ● **[b-2 Obtaining trust through communications]** Two-way communication with individuals, companies, industries, NPO organizations and infrastructure related companies is maintained by providing and explaining knowledge and exchanging opinions concerning natural disasters regularly or when necessary, taking part in joint disaster protection training, and making agreements to provide assets or products during disasters. ● **[b-3 Gaining trust by providing easily understood information]** Tools permitting intuitive understanding of the state of predicted threats (visual) are available, they are continuously evaluated, their effectiveness is improved and they are applied (including overseas). ● **[b-4 Cultivating leaders, experts etc.]** Adequate numbers of personnel such as leaders, experts, NPO etc. usable by every regional society are cultivated continuously.	● **[c-1 Information collection systems]** Systems that promptly and reliably clarify the state of threats that constantly change during disasters and actions taken by individuals, companies, and industry related organizations are available and are continuously improved by accumulating experiences of actual disasters. ● **[c-2 Information provision systems]** Systems that can reliably (including multiple routes that function during power failures) and promptly transmit the state of threats that continuously change during a disaster, evacuation orders etc., are provided and continuously improved by accumulating experiences of actual disasters. ● **[c-3 System for sharing information between jurisdictions]** In order to reliably and promptly make judgments and to transmit information to the public and perform restoration activities during a disaster, disaster protection organizations and infrastructures related companies possess systems that share information between jurisdictions.	● **[d-1 Support for advance measures by individuals]** For supporting advance measures by individuals and procedures for promoting seismic retrofitting are provided and are constantly improved. ● **[d-2 Support for BCP etc. of corporations]** To support the preparation of BCP of corporations and industry related organizations, knowledge and opinions are regularly exchanged and the need for facility management and improvement reflecting these views is clarified. ● **[d-3 Support for the restoration of infrastructures etc.]** By regularly exchanging views with infrastructure related companies and by accumulating experience of actual disasters, the need for execution planning to restore infrastructure is clarified. ● **[d-4 Managing and improving public facilities]** The need for management and improvement of public facilities such as disaster protection facilities or roads to simplify restoration and restrict the impact of disasters etc. is clarified. ● **[d-5 Improving countermeasure headquarters and other systems]** Skills, expertise, and systems are continuously improved by continuing disaster protection training and accumulating experience of actual disasters.

	Advance understanding of natural disasters **A** [Knowledge]	**Possibility of mutual trust, cooperation and mutual assistance** **B** [Social capital]	**Availability of needed information when it is required** **C** [Information systems]	**Ability to strengthen each region's capacity to withstand and to prepare for recovery from disasters** **D** [[Resistance/restoration capacity]
State that should be achieved, maintained, and advanced	● **[a-4 Cost of disasters]** Methods of calculating the costs of disasters and countermeasures are continuously improved. ● **[a-5 State of (region) society]** The present status of, "states that should be achieved, maintained, and improved" in each (region) society are continually indexed and clarified.	● **[b-5 Cultivating trust between infrastructure related companies and disaster prevention organizations]** Systems to share knowledge and information between infrastructure related companies and disaster protection organizations are established and used continuously to carry out two-way communications by, for example, constantly exchanging views.	● **[c-4 Contribution of the mass media]** Toward proper evacuations and damage mitigation by providing appropriate information from the mass media, agreements necessary to regularly exchange knowledge and information, and distributing images are arranged involving the local mass media.	● **[d-6 Level of improvement of disaster protection facilities]** Elements that should be considered regarding the minimization of the level of threat to an acceptable level are continuously indexed and clarified to manage and improve disaster protection facilities. ● **[d-7 Technological improvements]** Technological improvements including the material used to strengthen structures and buildings etc. against natural disasters are made continuously. ● **[d-8 Clarifying regional conditions]** The state of support according to regional conditions, such as the housing conditions of people who may be isolated or may have difficulty evacuating during a disaster are clarified to make advance study of measures necessary. ● **[d-9 Land use and population distribution]** Measures to rationalize land use and population distribution are taken continuously in order to restrict damage and to simplify restoration